

**WHAT IS CLAIMED IS:**

1. A water treatment reactor for simultaneous electrocoagulation and advanced oxidation processes comprising:
  - an upright sealed tank, the upright sealed tank having a metal body, or
  - 5 a metallic material mounted on an inner wall thereof, for use as a cathode;
  - a sacrificial electrode used as an anode which is disposed in the tank and non-electrically connected to the cathode;
  - an intake tube for introducing influent water into the bottom of the tank;
  - 10 an air input for introducing air or oxygen-containing gas into the tank;
  - a mixing device disposed in the bottom of the tank for enabling mixing of the influent water;
  - an outlet tube for venting processed water from a top of the tank;
  - a gas-liquid separator which is in fluid communication with the tank
  - 15 at the top of the tank for expelling a gas from the tank without water expelling; and
  - a direct current supply having a positive electrode electrically connected to the anode and a negative electrode electrically connected to the cathode.
- 20 2. The reactor as claimed in claim 1 further comprising an oxidant supply device mounted on the intake tube.
3. The reactor as claimed in claim 2, wherein the oxidant supply

device includes a venturi in fluid communication with the intake tube.

4. The reactor as claimed in claim 1, wherein the sacrificial electrode  
is made of iron, aluminum, copper or stainless steel.

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5. The reactor as claimed in claim 4, wherein the sacrificial electrode  
is made of iron.

6. The reactor as claimed in claim 1, wherein the reactor is made of

10 stainless steel.

7. The reactor as claimed in claim 1, wherein the mixing device  
further comprises a spiral board, a packing material or a perforated dish.

15 8. The reactor as claimed in claim 1, wherein the gas-liquid separator  
further comprises a gas-liquid separating valve.